

(19) World Intellectual Property Organization  
International Bureau



PCT



(43) International Publication Date  
21 December 2006 (21.12.2006)

(10) International Publication Number  
**WO 2006/134410 A3**

(51) International Patent Classification:  
*H01L 33/00* (2006.01)

(21) International Application Number:  
PCT/IB2004/004475

(22) International Filing Date:  
23 December 2004 (23.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
10/773,352 5 February 2004 (05.02.2004) US

(71) Applicant (for all designated States except US): **MAR-  
POLE INTERNATIONAL, INC.** [TR/CN]; 8/F Henley  
Building, 5 Queen's Road, Central, Hong Kong (CN).

(72) Inventor: **RATCLIFFE, William, R.**; 3193 White Cedar  
Place, Thousand Oaks, CA 91362 (US).

(74) Agent: **CHINA PATENT AGENT (H.K.) LTD.**; 22/F,  
Great Eagle Centre, 23 Harbour Road, Wanchai (HK).

(81) Designated States (unless otherwise indicated, for every  
kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, GR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY,  
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,  
ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,  
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,  
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,  
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, ML, MR, NE, SN, TD, TG).

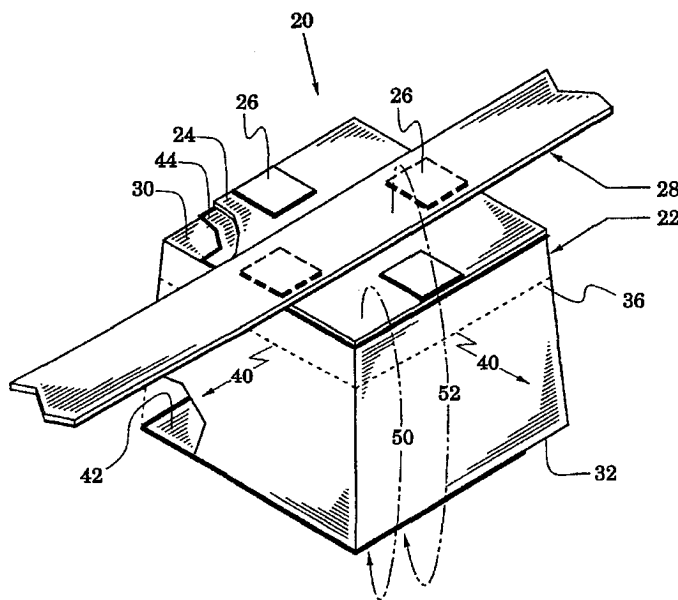
Published:

— with international search report

(88) Date of publication of the international search report:  
19 April 2007

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: LIGHT-EMITTING STRUCTURES



(57) Abstract: Light-emitting structures of reduced size are realized with combinations of light-emitting diodes (22), resistive and conductive films (24, 44), and interconnect members (28). Other embodiments are provided which simplify fabrication and assembly.

WO 2006/134410 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2004/004475

## A. CLASSIFICATION OF SUBJECT MATTER

H01L33/00 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: H01L H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI PAJ EPODOC CNPAT LIGHT EMITTING DIODE LED ANODE CATHODE RESIST+ CONTACT

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP2000-101150A (NODA TADAO) 07.Apr 2000 (07.04.2000) paragraph [0005]-[0012]; figs. 1-2	1-37
X	JP2-283070A (FUJI ELECTRIC CO LTD) 20.Nov 1990 (20.11.1990) page 456, line 1-page 458, line 4; figs. 1-5	1-37
X	JP64-32671A (HITACHI LTD) 02.Feb 1989 (02.02.1989) page 391, line 1-page 394; figs. 1-2	1-37
A	JP11-251641A (KYORAKU SANGYO KK) 17.Sep 1999(17.09.1999) the whole document	1-37
A	CN1437773A (DUPONT DISPLAY INC) 20.Aug 2003 (20.08.2003) the whole document	1-37

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

19.Jan 2007(19.01.2007)

Date of mailing of the international search report

01.FEB 2007 (01.02.2007)

Name and mailing address of the ISA/CN

The State Intellectual Property Office, the P.R.China  
6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China  
100088

Facsimile No. 86-10-62019451

Authorized officer

CUI, Shangke

Telephone No. (86-10)62085818

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/IB2004/004475

### Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The common technical features of claims 1, 18 and 28 are all disclosed by prior art, thus claims 1-17, 18-27 and 28-37 lack unity under Rule 13.1, 13.2 and 13.3.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.

PCT/IB2004/004475

Patent document Cited in search report	Publication data	Patent family member(s)	Publication data
JP2000101150A	07.04.2000	none	
JP2283070A	20.11.1990	none	
JP6432671A	02.02.1989	none	
JP11251641A	17.09.1999	none	
CN1437773A	20.08.2003	WO0199207A	27.12.2001
		CA2408321A	27.12.2001
		AU6853801A	02.01.2002
		US2002036291A	28.03.2002
		EP1292996A	19.03.2003
		US2003146436A	07.08.2003
		JP2003536227T	02.12.2003
		US2005184306A	25.08.2005